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Turin, 15 June 2004

Our Ref.: Case E-1778/03

Re: International Application No. PCT/EP 03/50382
in the name of AZIONARIA COSTRUZIONI MACHINE AUTOMATICHE...

Dear Sirs,

thank you for your Communication of 04.05.2004 relating to a first written opinion for the application in object.

According to Art. 34 and Rule 66 of the Patent Cooperation Treaty, we submit an amendment of the International Patent Application in object; please find enclosed herewith a copy of new pages 1-4 and 9-12 replacing the corresponding original pages 1-4 and 9-13.

The description was amend for identifying the most relevant prior art and in view of the amending of the claims.

The independent claims (now claims 1 and 7) were amended for encompassing subject matter disclosed in the original application as filed (page 5, lines 26 - page 6, lines 6) and in the original dependent claims 3-6 and 11-14.

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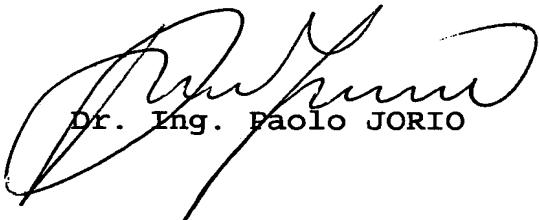
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In particular, page 5, lines 26 - page 6, lines 6 discloses that each labelling station 17 comprises a known labelling device 26, which is of the type described in Patent Application EP1122175A1 and withdraws a label 7 from a respective known store (not shown in detail) for applying a label 7 to a bottle 2. From the above, it is clear that each labelling station 17 is loaded with a same type of pre-printed labels 7 and applies to the relevant containers 2 always the same pre-printed label 7 in a given same position.

Yours faithfully,



Dr. Ing. Paolo JORIO

METHOD AND MACHINE FOR LABELLING A SUCCESSION OF CONTAINERS BY MEANS OF A NUMBER OF INDEPENDENT LABELLING STATIONS

5

TECHNICAL FIELD

The present invention relates to a method of labelling a succession of containers.

The present invention may be used to particular advantage for labelling a succession of bottles in a 10 bottling plant, to which the following description refers purely by way of example.

A bottling plant comprises a number of bottling lines, each comprising a succession of machines arranged in series. More specifically, each bottling line may 15 comprise a filling machine for receiving empty bottles from a store and filling each with a predetermined amount of a liquid product; a capping machine for applying a cap to each bottle; a labelling machine for applying one or more labels to each bottle; and, possibly, a packing 20 machine for packing a group of bottles to form a respective package.

BACKGROUND ART

Known labelling machines, such as the type described in DE19927668, DE3925842, US5478422A1, US5259913A1 or 25 EP1167213A1, comprise a vertical-axis carousel conveyor for feeding the bottles along an annular path through at least one labelling station, where a label is applied to each bottle. Known labelling machines may comprise either one labelling station, or two (or more) for applying, for 30 example, a front and rear label to each bottle.

Known bottling plants of the above type are relatively bulky and expensive by requiring an independent bottling line for each type of liquid product. Alternatively, the same bottling line may be used for 5 different liquid products, but only at the expense of frequent type changes (i.e. to adapt the bottling line to a different liquid product), thus obviously reducing overall output.

US-6419782-A1 discloses an automatic label printing 10 and application system, which applies a custom label at a dynamically determined location on articles being moved along a conveyer. The system includes a bar code scanning system, preferably a group of bar code scanners each arranged to read at an assigned elevation above the 15 conveyer belt; this configuration allows the system controller to generally determine the vertical height of pre-printed bar code on the article. The system uses photoelectric sensors to detect articles being moved along the conveyer, as well as an encoder and bar code scanning 20 data to determine the horizontal position of the pre-printed bar code on the surface of the article; in this manner, the system dynamically determines both the vertical and horizontal position of the pre-printed bar code on the surface of the article. The system further 25 includes a series of label printing and application stations that are configured to print customized labels on the surface of the article in a horizontal and vertical position to cover the pre-printed bar code, at least partially. In general, the stations are adjusted to apply 30 labels at different elevations above the conveyer belt;

the application elevation of labels is selected by selecting the appropriate label printing and application stations. The horizontal position of the label on the article is determined by coordinating encoder pulses in response to signals from photoelectric sensor for the respective label printing and application unit. The system also preferably includes a verification bar scanner at the downstream end to verify that an accurate label has been properly positioned on the article.

US-6220330-A1 discloses an apparatus for applying labels to articles being moved in a single-file along a conveyor assembly by a primary conveyor belt; articles such as video cassette containers or CD containers are conveyed in an upright singulated fashion along a conveyor assembly. Each individual article enters a labelling station where the article contacts a biasing assembly that includes a biasing belt. The biasing belt exerts a lateral force on the article to press the article into contact with a stationary guide assembly; the biasing belt is operated at substantially the same speed as the primary conveyor belt such that the article is held in contact with the stationary guide assembly as the article moves along the labelling station. A labelling unit applies a label to the article as the article is held in contact with the stationary guide assembly by the biasing belt.

DISCLOSURE OF INVENTION

It is an object of the present invention to provide a method of labelling a succession of containers, designed to eliminate the aforementioned drawbacks, and which, in particular, is cheap and easy to implement.

According to the present invention, there is provided a method and a machine for labelling a succession of containers as recited in the attached claims.

BRIEF DESCRIPTION OF THE DRAWINGS

5 A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

10 Figure 1 shows a schematic plan view, with parts removed for clarity, of part of a bottling plant featuring the labelling machine according to the present invention;

Figure 2 shows a larger-scale plan view of the Figure 1 labelling machine.

BEST MODE FOR CARRYING OUT THE INVENTION

Number 1 in Figure 1 and 2 indicates as a whole a 15 bottling line for filling bottles 2. Bottling line 1 comprises a known filling machine 3 for receiving empty bottles 2 from an input conveyor 4, and feeding full bottles 2 to a labelling machine 5 by means of an intermediate conveyor 6. On labelling machine 5, a label 7 20 is applied to each bottle 2, and bottles 2 are then fed onto an output conveyor 8, which feeds bottles 2 to a known packing machine (not shown).

Filling machine 3 is a so-called multiple type for filling bottles 2 with four types of liquid of different 25 colours, and comprises a vertical-axis carousel conveyor 9 for receiving empty bottles 2 from input conveyor 4 by means of a transfer drum 10, and for feeding full bottles 2 to a vertical-axis carousel conveyor 11 by means of a transfer drum 12. Carousel

CLAIMS

1) A method of labelling a succession of containers (2); the method comprising the following steps:

- 5 • identifying each container (2) to assign to the container (2) one of a number of possible types before the container (2) is fed along a labelling path (P);
- 10 • feeding each container (2) along the labelling path (P) through a number of labelling stations (17), each for applying a respective label (7) to a container (2) travelling through the labelling station (17);
- 15 • assigning a category of containers (2) to each labelling station (17);
- 20 • and only activating each labelling station (17) to apply the label (7) to the container (2) travelling through the labelling station (17) if the container (2) falls within the category of containers (2) assigned to the labelling station (17);

the method being characterized by the fact that each container (2) is identified only on the basis of the physical features of the container (2) or only by processing information from operating machines (3) located upstream from the labelling path (P); each labelling station (17) being loaded with a same type of pre-printed labels (7) and applying to the relevant containers (2) always the same pre-printed label (7) in a given same position.

2) A method as claimed in Claim 1, wherein each container (2) is identified by feeding the container (2) through a recognition station (16) located upstream from the labelling stations (17) along the labelling path (P) 5 and having at least one sensor (29) for identifying the container (2).

3) A method as claimed in Claim 1 or 2, wherein each container (2) is identified on the basis of the shape of the container (2).

10 4) A method as claimed in Claim 1 or 2, wherein each container (2) is identified on the basis of the size of the container (2).

15 5) A method as claimed in Claim 1 or 2, wherein each container (2) is identified on the basis of the colour of the container (2).

20 6) A method as claimed in one of Claims 1 to 5, wherein each labelling station (17) comprises a respective guide; and a respective labelling device (26), which is moved along the guide to adapt its position as a function of the shape and size of the containers (2) with respect to a conveyor (15) for feeding each container (2) along the labelling path (P).

25 7) A machine for labelling a succession of containers (2); the machine comprising a conveyor (15) for feeding each container (2) along a labelling path (P), a number of labelling stations (17), each located along the labelling path (P) and for applying a respective label (7) to a container (2) travelling through the labelling station (17), and a recognition device (28) for identifying each 30 container (2) and assigning to the container (2) one of a

number of possible types before the container (2) is fed along the labelling path (P); each labelling station (17) comprising respective control means (30) for memorizing a category of containers (2) assigned to the labelling station (17), and which only activate the respective labelling station (17) to apply the label (7) to the container (2) travelling through the labelling station (17) if the container (2) falls within the category of containers (2) assigned to the labelling station (17); the machine (5) being characterized by the fact that recognition device (28) is able to identify each container (2) only on the basis of the physical features of the container (2) or only by processing information from operating machines (3) located upstream from the labelling path (P); each labelling station (17) being loaded with a same type of pre-printed labels (7) and being able to apply to the relevant containers (2) always the same pre-printed label (7) in a given same position.

8) A machine as claimed in Claim 7, wherein the recognition device (28) comprises a recognition station (16) located upstream from the labelling stations (17) along the labelling path (P) and having at least one sensor (29) for identifying the container (2).

9) A machine as claimed in Claim 8, wherein the sensor (29) identifies each container (2) on the basis of the shape of the container (2).

10) A machine as claimed in Claim 8, wherein the sensor (29) identifies each container (2) on the basis of the size of the container (2).

30 11) A machine as claimed in Claim 8, wherein the

sensor (29) identifies each container (2) on the basis of the colour of the container (2).

12) A machine as claimed in one of Claims 7 to 11, wherein the conveyor (15) comprises a carousel conveyor 5 (20) with a vertical axis (21).

13) A machine as claimed in one of Claims 7 to 12, wherein each labelling station (17) comprises a respective guide; and a respective labelling device (26), which is mounted to move along the guide to adapt its position with 10 respect to the conveyor (15) as a function of the shape and size of the containers (2).